REMARKS

Claims 1-21 are pending after entry of this paper. Claims 1-21 have been rejected.

Claims 1, 9, and 10 have been amended. No new matter has been introduced by these cosmetic and/or broadening amendments. Reconsideration and withdrawal of the pending rejections in view of the above claim amendments and below remarks are respectfully requested.

Response to Rejections under 35 U.S.C. §112

The Examiner has rejected claims 9 under 35 U.S.C. §112, second paragraph, for allegedly being indefinite. Applicants have amended claim 9 to cancel the "preferably" terminology. Accordingly, applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. §112.

Response to Rejections under 35 U.S.C. §102

The Examiner has rejected claims 1-2, 4-8, 10, 13, 15, 17, and 21 under 35 U.S.C. §102(b) as allegedly anticipated by U.S. Patent No. 6,477,195 ("Mittag et al."). The Examiner specifically contends that Mittag et al. discloses "charging fine-grained metal (**11**) into an electric arc furnace," and that "before entering the furnace after the downpipe the bulk material stream is passed through a closing [*sic*] orifice (**12**) and enters the furnace essentially undisturbed" (paragraph 5 of the Office Action). Applicants respectfully disagree that the

referenced claims are anticipated by Mittag et al. Applicants specifically rebut the above-mentioned contentions of the Examiner with respect to claim 1.

Mittag et al. is directed to a process and electric-arc furnace for melting sponge iron. Sponge iron is introduced in the furnace via chutes or slides **12** through cover hole **10** and falls in the form of a trajectory parabola (as in Figures 1 and 3) or substantially vertically (as in Figures 5 and 6) into the metal melt **7** (see col. 3, lines 43-51 and col. 4, lines 35-42). Mittag et al. specifically describes the sponge iron **11** as being in the form of pellets and/or briquettes which can optionally be supplemented by fines (col. 3, lines 44-46). The supply of sponge iron through cover hole **10** appears to be effected by a flap valve or the like, which is directly below the hopper at the upper end of chute/slide **12** (neither numbered nor described in the text, but depicted in Figures 1 and 2). The sponge iron then slides down along chute/slide **12** (i.e., the downpipe) and falls into the furnace through the open end of the downpipe (below cover hole **10**). Regarding the embodiment in Figure 6, there appears to be a flap valve near cover hole **10** in downpipe **12** with a fixed left part and an opening right part (again neither numbered nor described in the text, but depicted in Figure 6).

In the first instance, applicants submit that Mittag et al. does not disclose charging fine-grained metal into an electric arc furnace, as required by claim 1. The Examiner points to element **11** of Mittag et al. as being the fine-grained metal. In contrast to the Examiner's contentions, Mittag et al. describes the sponge metal **11** as being pellets and/or briquettes, optionally supplemented by fines. Applicants respectfully submit that this does not meet the claim element of "charging fine-grained metal" as required by claim 1. Furthermore, applicants respectfully submit that the disclosure of Mittag et al. as a whole makes clear that the furnace is intended for the processing of lumpy and thus substantially coarse material. Specifically, the

method and apparatus of Mittag et al. is not suitable for charging fine-grained particles into the furnace because the stream of bulk material would be considerably enlarged during the free fall into the furnace, such that the fine particles would be entrained by the gases ascending from the hot metal bath. Indeed, Figures 1 and 3 (for the trajectory parabola) and Figure 6 (for the vertical fall) of Mittag et al. clearly show the enlargement of the stream of bulk material between the exit from the downpipe (through cover hole **10**) and the metal bath surface. As described in the instant specification, such a configuration would result in the fine-grained material being "either deposited on the lower surface of the furnace roof or [being] discharged from the furnace by the waste gas, and thus leads to considerable yield losses" (page 2, lines 26-27, emphasis added). Mittag et al. is thus clear that the material charged into the furnace is not fine-grained, as required by claim 1..

Furthermore, applicants respectfully submit that Mittag et al. does not disclose a "dosing orifice" through which the material stream is passed after exiting the downpipe, as required by claim 1. As mentioned above, Mittag et al. at best provides for a flap valve immediately following the hopper in the upper part of the downpipe. A flap valve as implicitly disclosed by Mittag et al. does not meet the claim element of a "dosing orifice." A flap valve would either be in the open or closed position. As such, no "dosing" (i.e., adjustable control of the material stream) is possible for a flap valve. In contrast, instant claim 1 requires that the material stream be passed through a dosing orifice. Furthermore, the flap valve of Mittag et al. is in the upper part of the downpipe, and thus the material stream does not pass through this valve after exiting the downpipe. In contrast, instant claim 1 requires that the material pass through the dosing orifice after exiting the downpipe. Accordingly, Mittag et al. does not meet this element of claim 1.

For the foregoing reasons, applicants respectfully submit that independent claim 1 is not anticipated by Mittag et al., because Mittag et al. does not disclose a) charging fine-grained metal into an electric arc furnace; and b) before entering the furnace after the downpipe the bulk material stream is passed through a dosing orifice. Applicants note that the foregoing argument is directly applicable to the patentability of independent claim 10 over Mittag et al., particularly with respect to the "dosing orifice." Accordingly, applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. §102(b) over Mittag et al.

The Examiner has also rejected claims 10, 13-19, and 21 under 35 U.S.C. §102(b) as allegedly anticipated by U.S. Patent No. 3,634,592 ("Pantke et al."). The Examiner specifically contends that Pantke et al. discloses an electric arc furnace with a downpipe, "wherein at the opening of the downpipe into [the] furnace a preferably round or oval dosing orifice is provided (figure 1)" (paragraph 6 of the Office Action). Applicants respectfully disagree, and specifically rebut the Examiner's contention with respect to independent claim 10 that Pantke et al. discloses a dosing orifice at the opening of the downpipe into the furnace.

Pantke et al. is directed to a system for charging electric-arc furnaces, wherein sponge iron is charged into the electric-arc furnace through vertical risers **4** (i.e., downpipes) and charging openings. Pantke et al. discloses means for adjusting the total sponge-iron feed rate as well as the feed rates to each of the charging openings (col. 2, lines 69-73), namely a metering device **5** (col. 4, lines 55-57) and a distributor **10** (col. 5, lines 1-20). The metering device **5** and distributor **10** are substantially upstream of downpipes **4**. Pantke et al. is completely silent as to the entry of the bulk material into the furnace at the opening of downpipes **4**.

Pantke et al. does not disclose a dosing orifice at the opening of the downpipe. In contrast, claim 10 requires that "at the opening of the downpipe into the furnace a preferably round or oval dosing orifice is provided." As set forth above regarding Mittag et al., a dosing orifice would necessarily provide for adjustable control of the material stream. Pantke et al. is completely silent as to the opening where material enters the furnace, and certainly does not describe the opening as providing adjustable control of the material stream. Therefore, because Pantke et al. does not disclose each and every element of independent claim 10, namely a dosing orifice at the opening of the downpipe into the furnace, applicants respectfully submit that claim 10 is not anticipated by Pantke et al. Accordingly, applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. §102(b) over Pantke et al.

Response to Rejections under 35 U.S.C. §103

The Examiner has rejected claim 9 under 35 U.S.C. §103(a) for allegedly being obvious over Mittag et al. alone. The Examiner specifically contends that Mittag et al. discloses substantially all the features of the invention as claimed, but is silent with respect to the grain size. The Examiner thus concludes that it would have been obvious to make the grain size smaller because "the smaller [the] grain size[,] the easy [*sic*] to treat when [it] flows into the furnace" (paragraph 8 of the Office Action).

In the first instance, applicants disagree that Mittag et al. discloses the substantially all the features of the invention as claimed, for the reasons set forth in detail above. Secondly, the Examiner's bold assertion that smaller grain sizes are easier to treat is both unsupported and incorrect. As described in the introduction of the instant specification, small

grain sizes pose considerable problems in the art, for instance with respect to being entrained into the waste gas system by the gases ascending from the hot metal bath during operation of the furnace (see, e.g., page 1, lines 28-30 of the instant specification). Furthermore, Mittag et al. implicitly suggests that the small grains optionally present in the sponge should be avoided or limited (see col. 2, lines 48-50, where it is stated "the sponge iron is introduced...in lumpy form...and, optionally partly in the form of fines," emphasis added). Accordingly, applicants respectfully submit that Mittag et al. teaches away from the invention as claimed. Applicants therefore request reconsideration and withdrawal of the rejection under 35 U.S.C. §103(a) over Mittag et al. alone.

The Examiner has rejected claims 3 and 11-12 under 35 U.S.C. §103(a) for allegedly being obvious over Mittag et al. in view of U.S. Patent No. 3,379,426 ("Reuter et al."). The Examiner has also rejected claim 11 under 35 U.S.C. §103(a) for allegedly being obvious over Pantke et al. in view of Reuter et al. The Examiner specifically contends that both Mittag et al. and Pantke et al. disclose substantially all the features of the claimed invention, and has combined these references with Reuter et al. for the alleged teaching of "a material stream passed through an iris (col. 4, lines 46-55)" (paragraphs 9 and 10 of the Office Action). The Examiner concludes that it would have been obvious to utilize a material stream passed through an iris as allegedly taught by Reuter et al. in the furnace of either Mittag et al. or Pantke et al. "in order to control the flow of material." Applicants respectfully disagree.

In the first instance, Mittag et al. and Pantke et al. do not disclose substantially all the features of the claimed invention, for the reasons set forth above.

Furthermore, Reuter et al. is directed to a suction device for an electric-arc furnace, which is provided to remove dust from the furnace (see, e.g., col. 1, lines 25-28). One of ordinary skill in the art would not look to the suction device of Reuter et al., and particularly the nozzle **59**, for any teaching by which to modify the method and structure for charging the reactor as described in Mittag et al. and Pantke et al.. Indeed, there is absolutely no relation between the nozzle **59** of the suction device door **4**, through which the material is charged into the furnace (col. 2, lines 60-61). Accordingly, applicants submit that this combination is improper, and respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. §103(a) over Mittag et al. or Pantke et al., each in view of Reuter et al.

Dependent Claims

Applicants have not independently addressed all of the rejections of the dependent claims. Applicants submit that for at least similar reasons as to why independent claims 1 and 10, from which all of the dependent claims 2-9 and 11-21 depend are believed allowable as discussed *supra*, the dependent claims are also allowable. Applicants however, reserve the right to address any individual rejections of the dependent claims and present independent bases for allowance of the dependent claims should such be necessary or appropriate.

Applicants wish to address at least one of the Examiner's specific contentions regarding dependent claims. Regarding claim 8, the Examiner contends that "it is presumed that the protective tube is cooled by surrounded air" (paragraph 5 of the Office Action). Similarly, regarding claim 19, the Examiner contends again that "it is presumed that the protective tube is cooled by surrounded air." Applicants, however, find no protective tube disclosed in either

Mittag et al. or Pantke et al., and therefore there can be no cooling of same. Applicants believe the Examiner's contentions to be unfounded.

Thus, applicants respectfully submit that the invention as recited in the claims as presented herein is allowable over the art of record, and respectfully request that the respective rejections be withdrawn.

CONCLUSION

Based on the foregoing amendments and remarks, applicants respectfully request reconsideration and withdrawal of the rejection of claims and allowance of this application. Favorable action by the Examiner is earnestly solicited.

In the event that the Examiner's believes that a telephone conference would be helpful in advancing prosecution of the instant application, the Examiner is invited to contact the undersigned at the number provided.

AUTHORIZATION

The Commissioner is hereby authorized to charge any additional fees which may be required for consideration of this Amendment to Deposit Account No. **13-4500**, Order No. 4791-4017.

Applicants believe this paper to be timely filed. In the event that an extension of time is required, or which may be required in addition to that requested in a petition for an extension of time, the Commissioner is requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to Deposit Account No. **13-4500**, Order No. 4791-4017.

Respectfully submitted,
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